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# FOREST PEST MANAGEMENT

United States
Department of
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Forest
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State &
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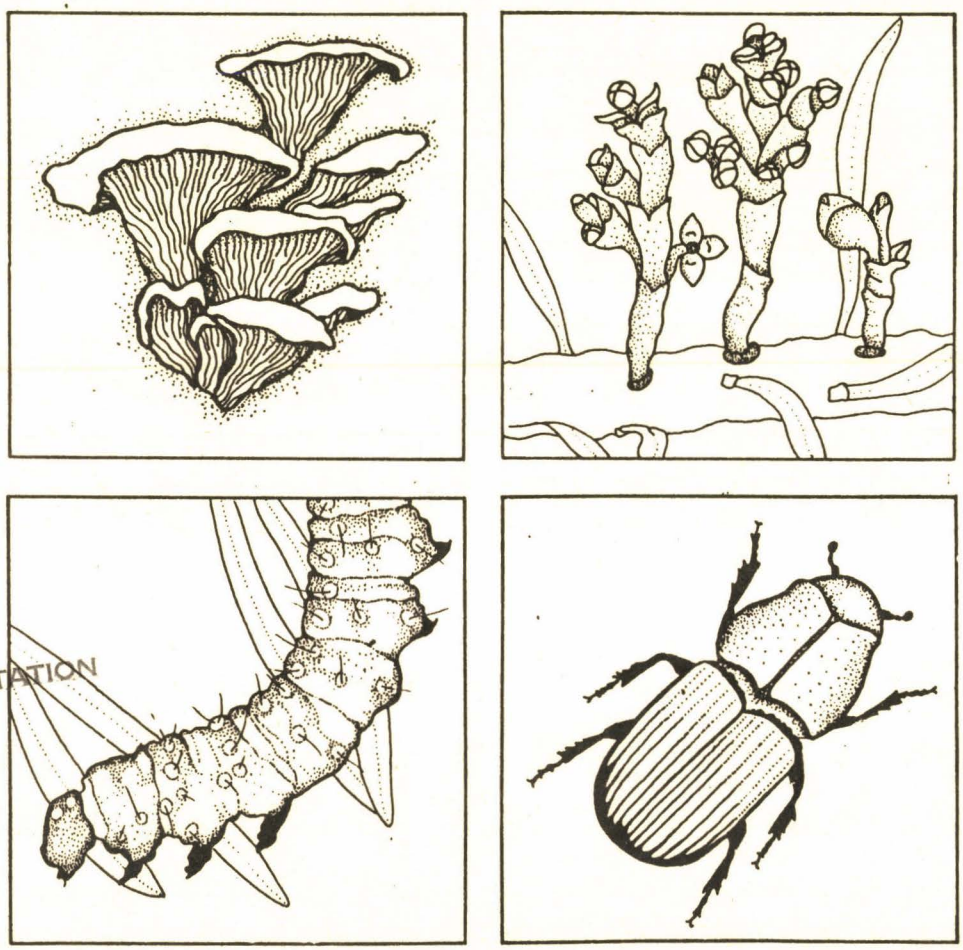
Forestry

## MOUNTAIN PINE BEETLE INFESTATIONS IN THE NORTHERN REGION DURING 1985

Report No. 86-9

August 1986

Scott Tunnock, Mark D. McGregor,
Robert D. Oakes, Hubert E. Meyer



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# MOUNTAIN PINE BEETLE INFESTATIONS IN THE NORTHERN REGION DURING 1985

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Table 2.--Acres of pines infested by the mountain pine beetle and ponderosa pine trees killed per acre in infested areas on two Ranger Districts, Bitterroot National Forest, 1984 and 1985.

| Ownership | Host | Acres infested 1984 | Acres infested 1985 | Average trees killed/acre Older | Average trees killed/acre 1984 | Average trees killed/acre 1985 | Total killed per acre |
|---|---|---|---|---|---|---|---|
| Darby RD | PP | 1,043 | 925 | 12.4 | 44.5 | 83.4 | 140.3 |
| | LPP | 0 | 0 | -- | -- | -- | -- |
| Sula RD | PP | 357 | 0 | 20.5 | 114.4 | 70.0 | 204.9 |
| | LPP | 41 | 0 | -- | -- | -- | -- |
| Stevensville RD | PP | 0 | 1 | -- | -- | -- | -- |
| | LPP | 0 | 0 | -- | -- | -- | -- |
| West Fork RD | PP | 266 | 29 | -- | -- | -- | -- |
| | LPP | 3,965 | 779 | -- | -- | -- | -- |
| State, private, other | PP | 2,413 | 666 | -- | -- | -- | -- |
| | LPP | 0 | 0 | -- | -- | -- | -- |
| TOTALS | | 8,085 | 2,400 | -- | -- | -- | -- |

## CUSTER NATIONAL FOREST

Mortality in PP stands decreased throughout the Custer National Forest in 1985. Most damage was on the Sioux Ranger District in the Ekalaka Hills. One spot of WBP was infested south of Red Lodge (Table 3, Figure 3).

Table 3.--Acres of pines infested by the mountain pine beetle on the Custer National Forest, 1984 and 1985.

| Ownership | Acres infested 1984 LPP | 1984 PP | 1984 WBP | 1985 LPP | 1985 PP | 1985 WBP |
|---|---|---|---|---|---|---|
| Ashland RD | 0 | 110 | 0 | -- | -- | -- |
| Beartooth RD | 3 | 0 | 229 | 1 | 0 | 1 |
| Sioux RD | 1 | 1,048 | 0 | 0 | 215 | 0 |
| State, private, other | 205 | 272 | 352 | 5 | 264 | 110 |
| Total acres | 209 | 1,430 | 581 | 6 | 479 | 111 |

## DEERLODGE NATIONAL FOREST

The number of acres of LPP infested by the MPB decreased from 7,049 in 1984, to 4,986 in 1985 on the Deerlodge NF (Figure 4). Most of the damage was on the Jefferson Ranger District in the Homestake Pass area where, although infested acres decreased, trees killed per acre in infested areas more than doubled (Table 4).

Table 4.--Acres of lodgepole pine infested by the mountain pine beetle, and trees killed per acre in infested areas on the Jefferson Ranger District, Deerlodge National Forest, 1984 and 1985.

| Ownership | Acres infested 1984 | Acres infested 1985 | Average trees killed/acre Older | Average trees killed/acre 1984 | Average trees killed/acre 1985 | Total killed per acre |
|---|---|---|---|---|---|---|
| Deerlodge RD | 34 | 0 | -- | -- | -- | -- |
| Jefferson RD | 6,329 | 4,943 | 26.9 | 10.8 | 25.7 | 63.4 |
| Butte RD | 71 | 0 | -- | -- | -- | -- |
| Phillipsburg RD | 114 | 20 | -- | -- | -- | -- |
| State, private, other | 501 | 23 | -- | -- | -- | -- |
| TOTALS | 7,049 | 4,986 | -- | -- | -- | -- |

## FLATHEAD NATIONAL FOREST

Mortality in LPP stands increased from 170,124 acres in 1984, to 225,497 acres in 1985 on the Flathead NF. Increases occurred on all Ranger Districts except Spotted Bear (Table 5). The greatest increase was on the Tally Lake Ranger District west of Kalispell where 99,124 acres were infested (Figure 5). High altitude WBP stands and mature stands of western white pine (WWP) over the Flathead NF are slowly being depleted. On State and private lands, 9,001 acres of PP were infested.

An outbreak is starting to develop in the mountains on the east side of Flathead Lake south of Bigfork. Mortality will increase on the Swan Lake and Tally Lake Ranger Districts in 1986 (Table 5).

## GALLATIN NATIONAL FOREST

No aerial or ground surveys were made on the Gallatin National Forest during 1985 by Forest Pest Management. During 1984, 228,255 acres of LPP and some WBP were infested by the MPB on this Forest. The outbreak has been steadily decreasing since 1981 and will probably be close to dying out in 1986.

Table 5.--Acres of pines infested by the mountain pine beetle and trees killed per acre in infested areas on the Flathead National Forest, 1984 and 1985.

| Ownership | Host | Acres infested 1984 | Acres infested 1985 | Average trees killed per acre Older | Average trees killed per acre 1984 | Average trees killed per acre 1985 | Total killed per acre |
|---|---|---|---|---|---|---|---|
| Glacier View RD | LPP | 676 | 921 | -- | -- | -- | -- |
| | WBP | 892 | 1,107 | -- | -- | -- | -- |
| | WWP | 269 | 245 | -- | -- | -- | -- |
| Hungry Horse RD | LPP | 394 | 1,331 | -- | -- | -- | -- |
| | WBP | 80 | 458 | -- | -- | -- | -- |
| | WWP | 851 | 1,036 | -- | -- | -- | -- |
| Spotted Bear RD | LPP | 364 | 292 | -- | -- | -- | -- |
| | WBP | 13 | 70 | -- | -- | -- | -- |
| | WWP | 113 | 110 | -- | -- | -- | -- |
| Swan Lake RD | LPP | 17,681 | 23,279 | 27.8 | 19.0 | 48.9 | 95.7 |
| | WBP | 21 | 683 | -- | -- | -- | -- |
| | WWP | 0 | 183 | -- | -- | -- | -- |
| | PP | 12 | 62 | -- | -- | -- | -- |
| Tally Lake RD | LPP | 56,976 | 99,124 | 16.2 | 33.5 | 110.4 | 160.1 |
| | WWP | 1 | 0 | -- | -- | -- | -- |
| | PP | 3 | 0 | -- | -- | -- | -- |
| State, private other | LPP | 94,033 | 100,550 | -- | -- | -- | -- |
| | WBP | 0 | 1 | -- | -- | -- | -- |
| | WWP | 13 | 316 | -- | -- | -- | -- |
| | PP | 13,567 | 9,001 | -- | -- | -- | -- |
| TOTALS | | 185,959 | 238,769 | -- | -- | -- | -- |

## HELENA NATIONAL FOREST

Outbreaks in LPP stands decreased from 2,830 acres in 1984, to 1,531 acres in 1985, but increased in PP stands from 2 acres in 1984, to 792 acres in 1985 (Table 6). Most of the damage in LPP stands is on the Townsend Ranger District in the Deep Creek area (Figure 6A). An evaluation in Deep Creek to determine trees killed per acre in infested areas showed 27.8 old killed trees, 21.2 trees killed in 1984, and 24.3 killed in 1985 which totaled 73.3 trees killed per acre. This indicates a slight increase in damage during 1985. Damage in PP stands continued on State and private lands in the Wolf Creek area and increased north of Fort Logan, west of the Smith River (Figure 6B).

Table 6.--Acres of pines infested by the mountain pine beetle on the Helena National Forest, 1984 and 1985.

| | Acres infested | | | | |
|---|---|---|---|---|---|
| | 1984 | | 1985 | | |
| Ownership | LPP | PP | LPP | PP | WBP |
| Canyon Ferry RD | 131 | 0 | 0 | 39 | 0 |
| Townsend RD | 1,858 | 0 | 1,335 | 0 | 0 |
| Helena RD | 0 | 2 | 2 | 169 | 0 |
| Lincoln RD | 0 | 0 | 5 | 3 | 48 |
| State, private, other | 841 | 0 | 189 | 581 | 0 |
| TOTAL ACRES | 2,830 | 2 | 1,531 | 792 | 48 |

## IDAHO PANHANDLE NATIONAL FORESTS

Stands of mature WWP continued to be depleted by the MPB throughout northern Idaho. Damage was heaviest on the Bonners Ferry Ranger District and north of Priest Lake (Table 7). It appears that an outbreak in LPP stands was started when beetles emerged from infested logs stored at a sawmill at Moyie River. Efforts are being made to contain this infestation.

Table 7.--Acres of pines infested by the mountain pine beetle on the Idaho Panhandle National Forests during 1985.

| | Acres infested | | |
|---|---|---|---|
| Ownership | WWP | PP | LPP |
| St. Maries RD | 1 | 0 | 0 |
| Bonners Ferry RD | 710 | 11 | 41 |
| Priest Lake RD | 64 | 0 | 0 |
| State, private, other | 104 | 76 | 326 |
| TOTAL ACRES | 879 | 87 | 367 |

## KOOTENAI NATIONAL FOREST

The amount of acreage on the Kootenai NF infested by the MPB decreased slightly from 1984 to 1985 (Table 8). In LPP stands it decreased from 597,477 acres in 1984, to 554,979 acres in 1985. In adjacent PP stands infestation increased from 9,927 acres in 1984, to 21,219 acres in 1985. Most of the increased killing of PP occurred along the Fisher River. An epidemic is building rapidly on the Fisher River RD on the east side of Lake Koocanusa near Richards Mountain. From 1984 to 1985, there was an average buildup ratio of 1:7 infested lodgepole pine trees per acre. In one stand there were 381 trees/acre that were killed in 1985. The outbreak is decreasing in the Yaak River area but will continue to increase in the southeast quarter of the Kootenai National Forest (Table 8, Figure 7). In 1985, almost 2 million killed pine trees were recorded.

Table 8.--Acres of pines infested by the mountain pine beetle and lodgepole pine trees killed per acre in infested areas on five Ranger Districts, Kootenai National Forest, 1984 and 1985.

| Ownership | Host | Acres infested 1984 | Acres infested 1985 | Average trees killed/acre Older | Average trees killed/acre 1984 | Average trees killed/acre 1985 | Total killed per acre |
|---|---|---|---|---|---|---|---|
| Cabinet RD | LPP | 2,324 | 4,888 | -- | -- | -- | -- |
| | WWP | 1 | 406 | -- | -- | -- | -- |
| | PP | 3 | 2 | -- | -- | -- | -- |
| Fisher River RD | LPP | 177,617 | 174,405 | 58.9 | 55.0 | 63.6 | 177.5 |
| | WWP | 10 | 3 | -- | -- | -- | -- |
| | PP | 2,949 | 9,784 | -- | -- | -- | -- |
| Fortine RD | LPP | 38,691 | 19,291 | 5.6 | 25.9 | 51.7 | 83.2 |
| | WBP | 210 | 0 | -- | -- | -- | -- |
| | WWP | 151 | 0 | -- | -- | -- | -- |
| | PP | 23 | 191 | -- | -- | -- | -- |
| Libby RD | LPP | 16,898 | 53,070 | 18.5 | 31.3 | 55.8 | 105.6 |
| | WBP | 3 | 202 | -- | -- | -- | -- |
| | WWP | 408 | 94 | -- | -- | -- | -- |
| | PP | 366 | 1,846 | -- | -- | -- | -- |
| Rexford RD | LPP | 29,758 | 28,081 | 33.2 | 36.1 | 28.4 | 97.7 |
| | WBP | 90 | 0 | -- | -- | -- | -- |
| | WWP | 25 | 24 | -- | -- | -- | -- |
| | PP | 12 | 344 | -- | -- | -- | -- |
| Troy RD | LPP | 299 | 1,433 | -- | -- | -- | -- |
| | WWP | 87 | 320 | -- | -- | -- | -- |
| | PP | 8 | 159 | -- | -- | -- | -- |
| Yaak RD | LPP | 107,449 | 82,230 | 38.6 | 16.0 | 5.7 | 60.3 |
| | WWP | 22 | 123 | -- | -- | -- | -- |
| State, private, other | LPP | 224,511 | 191,581 | -- | -- | -- | -- |
| | WBP | 0 | 60 | -- | -- | -- | -- |
| | WWP | 11 | 9 | -- | -- | -- | -- |
| | PP | 6,566 | 8,893 | -- | -- | -- | -- |
| TOTALS | | 608,492 | 577,439 | -- | -- | -- | -- |

## LEWIS AND CLARK NATIONAL FOREST

Only 68 acres of LPP trees were infested on the Lewis and Clark NF during 1985 (Table 9). However, in PP stands, damage increased from 1,299 acres in 1984, to 26,630 acres in 1985. Most of this mortality was north and south of Lewistown in the Judith and Snowy Mountains (Figure 8). Chronic damage persists in PP stands in the Upper Judith River drainage. All areas evaluated, except some spots in the Snowy Mountains, showed that damage decreased in PP stands from 1984 to 1985 (Table 10).

Table 9.--Acres of pines infested by the mountain pine beetle on the Lewis and Clark National Forest, 1984 and 1985.

| | Acres infested | | | |
|---|---|---|---|---|
| | 1984 | | 1985 | |
| Ownership | LPP | PP | LPP | PP |
| Kings Hill RD | 5 | 80 | 66 | 575 |
| Judith RD | 100 | 684 | 0 | 1,188 |
| Musselshell RD | 81 | 100 | 1 | 2,744 |
| State, private, other | 183 | 435 | 1 | 22,123 |
| TOTAL ACRES | 369 | 1,299 | 68 | 26,630 |

Table 10.--Ponderosa pines killed per acre in infested areas on the Lewis and Clark National Forest, 1984 and 1985.

| | Average trees killed per acre | | | Total killed |
|---|---|---|---|---|
| Area | Old | 1984 | 1985 | per acre |
| Mussellshell RD | 21.5 | 62.5 | 30.6 | 114.6 |
| Belt RD | 3.5 | 26.9 | 21.8 | 52.2 |
| N. side Big Snowies | 23.5 | 173.4 | 0 | 196.9 |
| Snowies | 7.3 | 0 | 17.6 | 24.9 |

## LOLO NATIONAL FOREST

The number of acres of pines infested by the MPB decreased from 58,412 in 1984, to 36,621 in 1985 (Table 11). Lodgepole pine stands are being depleted the most but damage decreased from 48,224 acres in 1984, to 30,582 acres in 1985. The most susceptible LPP stands being infested are on the Plains Ranger District and in the Thompson River complex (Figure 9A). In 1985, 4,923 acres of PP were infested. The greatest amount of this damage occurred in the Garnet Mountains and in the Blackfoot River drainage (Figure 9B). Infestations seem to be decreasing in LPP stands on the Ninemile and Plains Ranger Districts, but may increase on the Superior Ranger District (Table 11).

Table 11.--Acres of pines infested by the mountain pine beetle and trees killed per infested acre on the Lolo National Forest, 1984 and 1985.

| Ownership | Host | Acres infested 1984 | Acres infested 1985 | Average trees killed/acre Older | Average trees killed/acre 1984 | Average trees killed/acre 1985 | Total killed per acre |
|---|---|---|---|---|---|---|---|
| Missoula RD | LPP | 202 | 0 | -- | -- | -- | -- |
| | PP | 92 | 71 | -- | -- | -- | -- |
| Ninemile RD | LPP | 2,088 | 4,225 | 0 | 40.0 | 29.1 | 69.1 |
| | PP | 393 | 313 | -- | -- | -- | -- |
| | WBP | 80 | 0 | -- | -- | -- | -- |
| | WWP | 327 | 0 | -- | -- | -- | -- |
| Plains RD | LPP | 27,665 | 13,102 | 64.2 | 75.7 | 47.7 | 187.6 |
| | PP | 627 | 451 | -- | -- | -- | -- |
| | WBP | 118 | 0 | -- | -- | -- | -- |
| Superior RD | LPP | 2,089 | 374 | 36.4 | 5.4 | 22.2 | 64.0 |
| | PP | 521 | 371 | -- | -- | -- | -- |
| | WWP | 20 | 0 | -- | -- | -- | -- |
| Thompson Falls RD | LPP | 7,315 | 2,205 | -- | -- | -- | -- |
| | PP | 487 | 40 | -- | -- | -- | -- |
| | WBP | 2,111 | 335 | -- | -- | -- | -- |
| | WWP | 76 | 1 | -- | -- | -- | -- |
| Seeley Lake RD | LPP | 0 | 230 | -- | -- | -- | -- |
| | PP | 0 | 1 | -- | -- | -- | -- |
| | WBP | 0 | 779 | -- | -- | -- | -- |
| Garnet Mtns. | LPP | 12 | 389 | -- | -- | -- | -- |
| | PP | 3,344 | 2,962 | -- | -- | -- | -- |
| State, private, other | LPP | 8,853 | 10,057 | -- | -- | -- | -- |
| | PP | 1,897 | 714 | -- | -- | -- | -- |
| | WBP | 10 | 1 | -- | -- | -- | -- |
| | WWP | 85 | 0 | -- | -- | -- | -- |
| TOTAL ACRES | | 58,412 | 36,621 | -- | -- | -- | -- |

## NEZPERCE NATIONAL FOREST

Infestations in LPP stands decreased from 18,042 acres in 1984, to 4,792 acres in 1985 (Table 12). Damage in PP stands is still a minor problem. Evaluations on the Red River and Elk City Ranger Districts indicate the outbreak is starting to increase again in their LPP stands (Table 12). These two Districts contain the most MPB damage on the Nezperce National Forest (Figure 10).

Table 12.--Acres of pines infested by the mountain pine beetle and lodgepole pine trees killed per acre in infested areas on two Ranger Districts, Nezperce National Forest, 1984 and 1985.

| Ownership | Host | Acres infested 1984 | Acres infested 1985 | Average trees killed/acre Older | Average trees killed/acre 1984 | Average trees killed/acre 1985 | Total killed per acre |
|---|---|---|---|---|---|---|---|
| Slate Cr. RD | LPP | 0 | 2 | -- | -- | -- | -- |
| | PP | 0 | 26 | -- | -- | -- | -- |
| Red River RD | LPP | 13,899 | 4,257 | 9.6 | 0.8 | 4.1 | 14.5 |
| | PP | 0 | 2 | -- | -- | -- | -- |
| Elk City RD | LPP | 3,152 | 23 | 5.3 | 2.4 | 3.8 | 11.5 |
| | PP | 0 | 2 | -- | -- | -- | -- |
| State, private, other | LPP | 991 | 510 | -- | -- | -- | -- |
| | PP | 0 | 3 | -- | -- | -- | -- |
| TOTAL ACRES | | 18,042 | 4,825 | -- | -- | -- | -- |

## GLACIER NATIONAL PARK

The MPB has just about killed all the high-hazard stands of pines in Glacier National Park. In 1985, only 12,412 acres of LPP were infested (Table 13). Most of the damage occurred on the east side from St. Mary's Lake north to the Canadian border, and along the middle fork of the Flathead River (Figure 11).

Damage is still chronic in mature WWP stands on the west side along drainages flowing into the middle fork of the Flathead River.

Table 13.--Acres of pines infested by the mountain pine beetle in Glacier National Park, 1984 and 1985.

| Year | Acres infested LPP | WBP | PP | WWP | Totals |
|---|---|---|---|---|---|
| 1984 | 17,620 | 5 | 0 | 520 | 18,145 |
| 1985 | 12,412 | 157 | 1 | 58 | 12,628 |

## YELLOWSTONE NATIONAL PARK

The outbreak in Yellowstone National Park has just about ended. The number of acres of LPP/WBP type infested decreased from 106,498 in 1984, to 6,929 in 1985. Most of this damage is in the Mammoth Hot Springs area and to the south (Figure 12).

## BLACKFEET INDIAN RESERVATION

The outbreak in LPP stands on the Blackfeet Indian Reservation has decreased from 8,721 acres in 1984, to 4,188 acres in 1985. Most of the damage is east of the Belly River adjacent to Glacier National Park (Figure 11). In 1985, 10,426 LPP faders were detected on the Reservation.

## CROW INDIAN RESERVATION

The outbreak in PP stands within the Rosebud Mountains east of Lodge Grass increased from 1,247 acres in 1984, to 5,717 acres in 1985 (Figure 13). An evaluation to determine trees killed per acre showed there was an average of 21.9 older killed trees, 22.2 trees killed in 1984, and 28.3 killed in 1985 which totaled 72.4 trees killed per acre. This indicates the infestation increased during 1985.

## NORTHERN CHEYENNE INDIAN RESERVATION

Damage in PP stands east of Lame Deer decreased from 3,313 acres in 1984, to 2,166 acres in 1985. Only 644 killed trees were detected during 1985 (Figure 14).

## FLATHEAD INDIAN RESERVATION

Damage in pine stands increased from 2,138 acres in 1984, to 3,887 acres in 1985 (Table 14). Most tree killing in LPP stands is occurring in the northwestern corner of the Reservation (Figure 15A). Ponderosa pine mortality is abundant there also, but is occurring throughout the Reservation (Figure 15B). In 1985, 908 LPP and 1,511 PP faders were detected on the Reservation. An evaluation in Mill Creek showed that 103 LPP per acre infested were killed in 1984, but none was killed in 1985. This indicates damage is decreasing in this area.

Table 14.--Acres of pines infested by the mountain pine beetle on the Flathead Indian Reservation, 1984 and 1985.

| | Acres infested | | | |
|---|---|---|---|---|
| Year | LPP | PP | WBP | Totals |
| 1984 | 915 | 1,223 | 0 | 2,138 |
| 1985 | 1,923 | 1,825 | 139 | 3,887 |

## FORT BELKNAP INDIAN RESERVATION/BUREAU OF LAND MANAGEMENT

The outbreak in PP stands in the Little Rocky Mountains decreased from 1,333 acres in 1984, to 925 acres in 1985. Most damage is on Bureau of Land Management (BLM) lands northeast of Zortman (Figure 16). An evaluation on BLM lands showed there were 100 trees killed per acre in infested areas in 1984, and 40 killed in 1985. This indicates the infestation is decreasing in that area. In 1985, 1,172 PP faders were detected in the Little Rocky Mountain area.

## ROCKY BOY'S INDIAN RESERVATION

This Reservation was not surveyed during 1985. However, the MPB is at a low level in PP stands and some stands of LPP.

## STILLWATER STATE FOREST

This Forest was not surveyed during 1985. In 1984, 1,336 acres of LPP type were infested. Damage probably persisted in 1985.

## SWAN RIVER STATE FOREST

The MPB is at a low level in pine stands on this Forest. In 1985, 28 acres of WWP, 1 acre of PP, 12 acres of LPP, and 6 acres of WBP were infested. This amounted to 53 pine faders. This was a great decrease in damage over 1984 when 2,730 acres of LPP were infested on private lands in this area.

## THOMPSON RIVER STATE FOREST

Damage in LPP and PP stands decreased in this area during 1985 (Figure 9). On State lands, 173 acres of PP were infested and 659 acres of LPP were infested. This amounted to 1,747 pine faders in 1985. No data were computed for damage on private lands within the State Forest.

## CRAIG MOUNTAINS, IDAHO

The outbreak persists in the Craig Mountains. Acres infested were not computed for 1985, but in 1984, 6,257 acres of LPP were infested along with 460 acres of adjacent PP. A 1985 evaluation to determine average trees killed per acre in LPP stands showed 63.6 old killed trees, 77.6 trees killed in 1984, and 33.6 trees killed in 1985 which equaled 174.8 killed trees per acre infested in this unit. This data indicates the outbreak is decreasing in LPP stands in the Craig Mountains.

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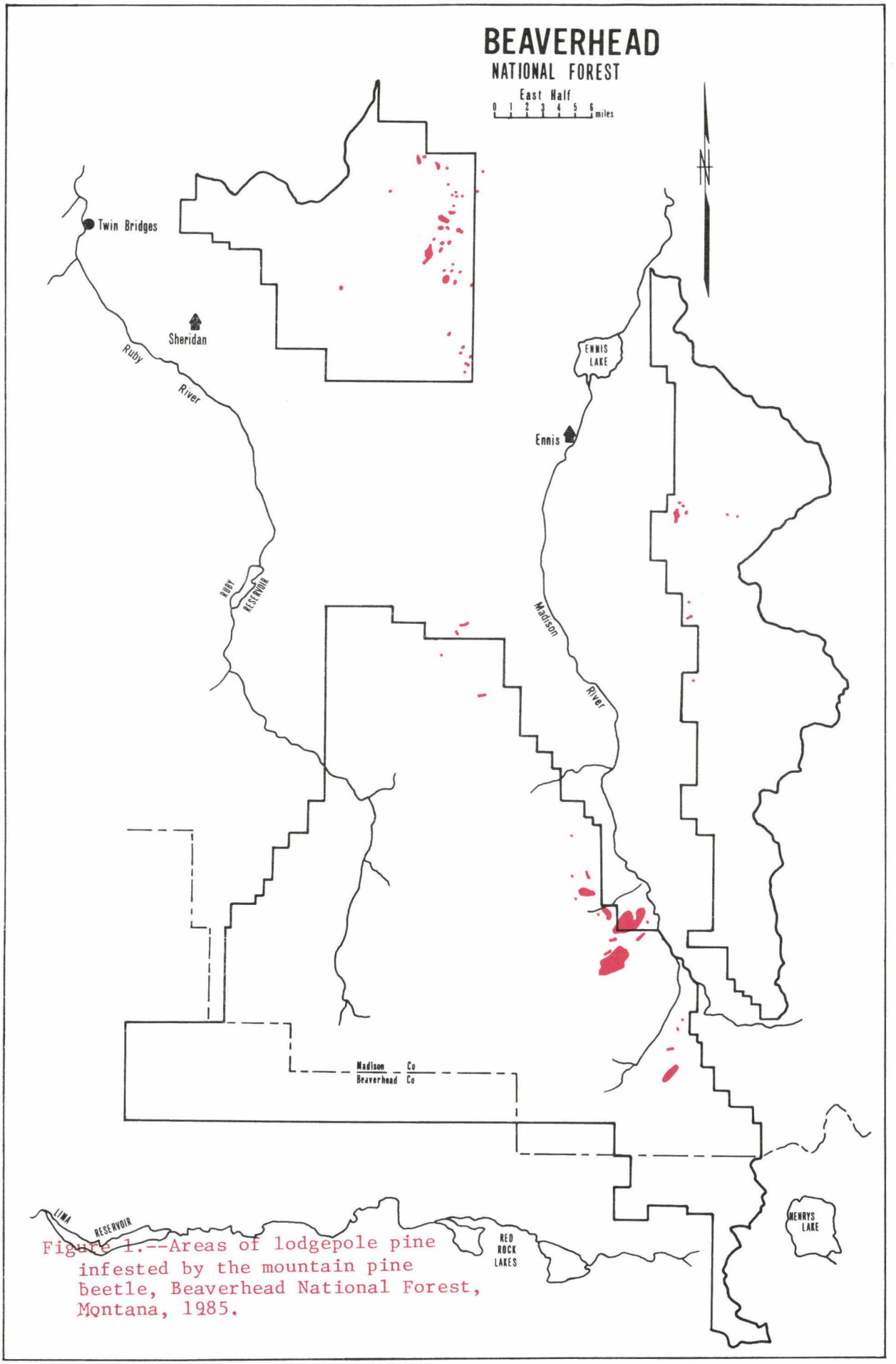
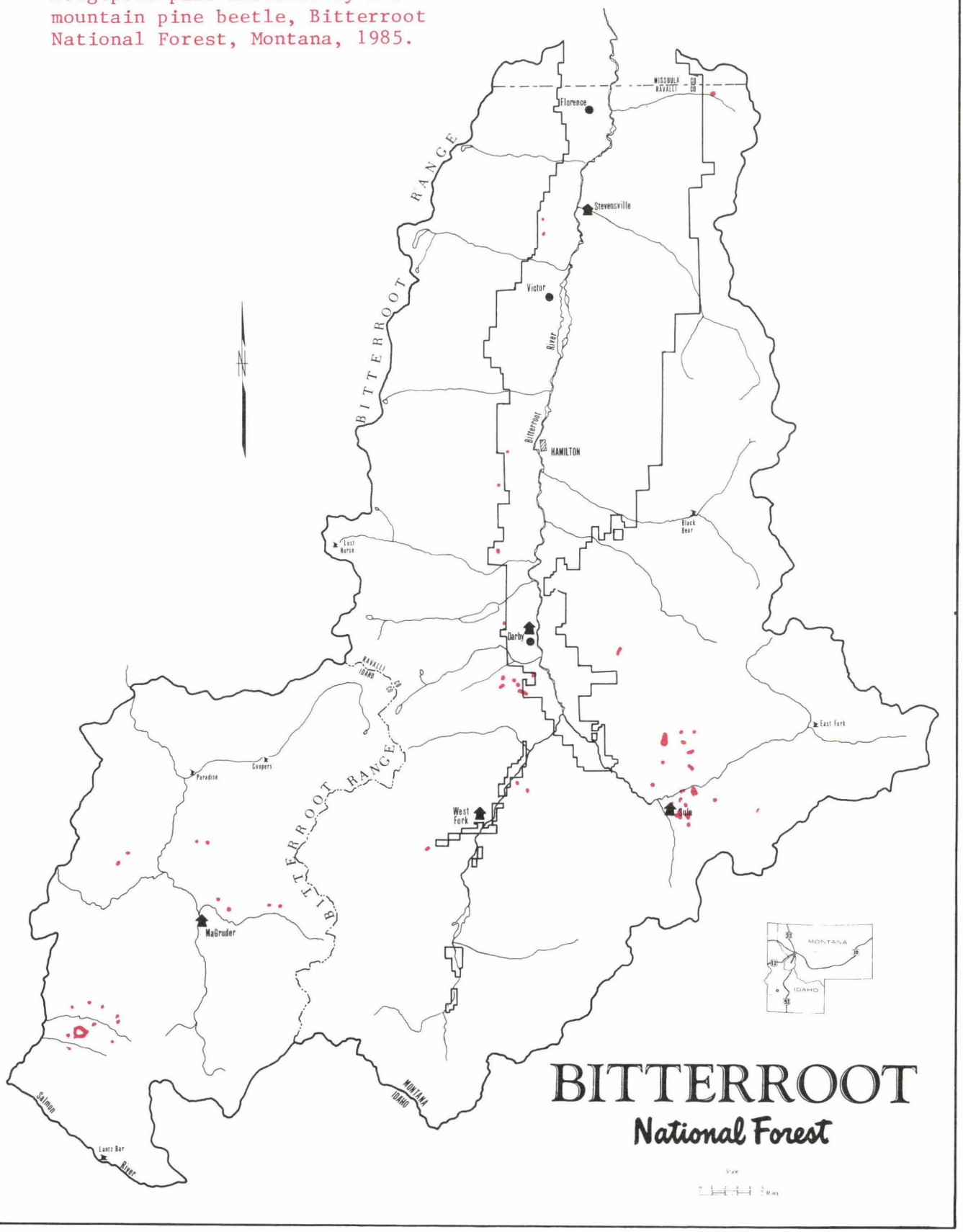



Figure 1.--Areas of lodgepole pine infested by the mountain pine beetle, Beaverhead National Forest, Montana, 1985.

Figure 2.--Areas of ponderosa and lodgepole pine infested by the mountain pine beetle, Bitterroot National Forest, Montana, 1985.



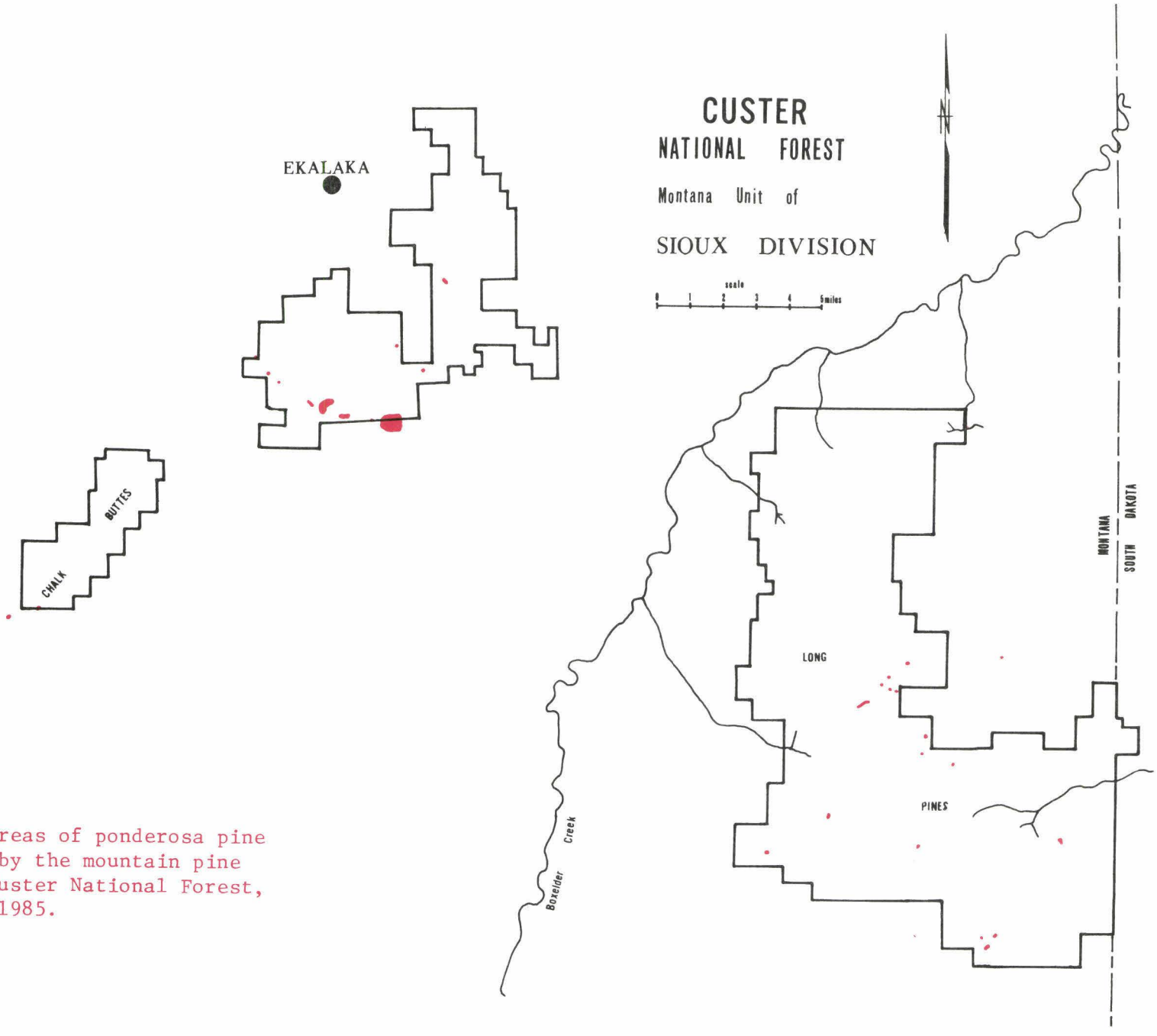



Figure 3.--Areas of ponderosa pine infested by the mountain pine beetle, Custer National Forest, Montana, 1985.

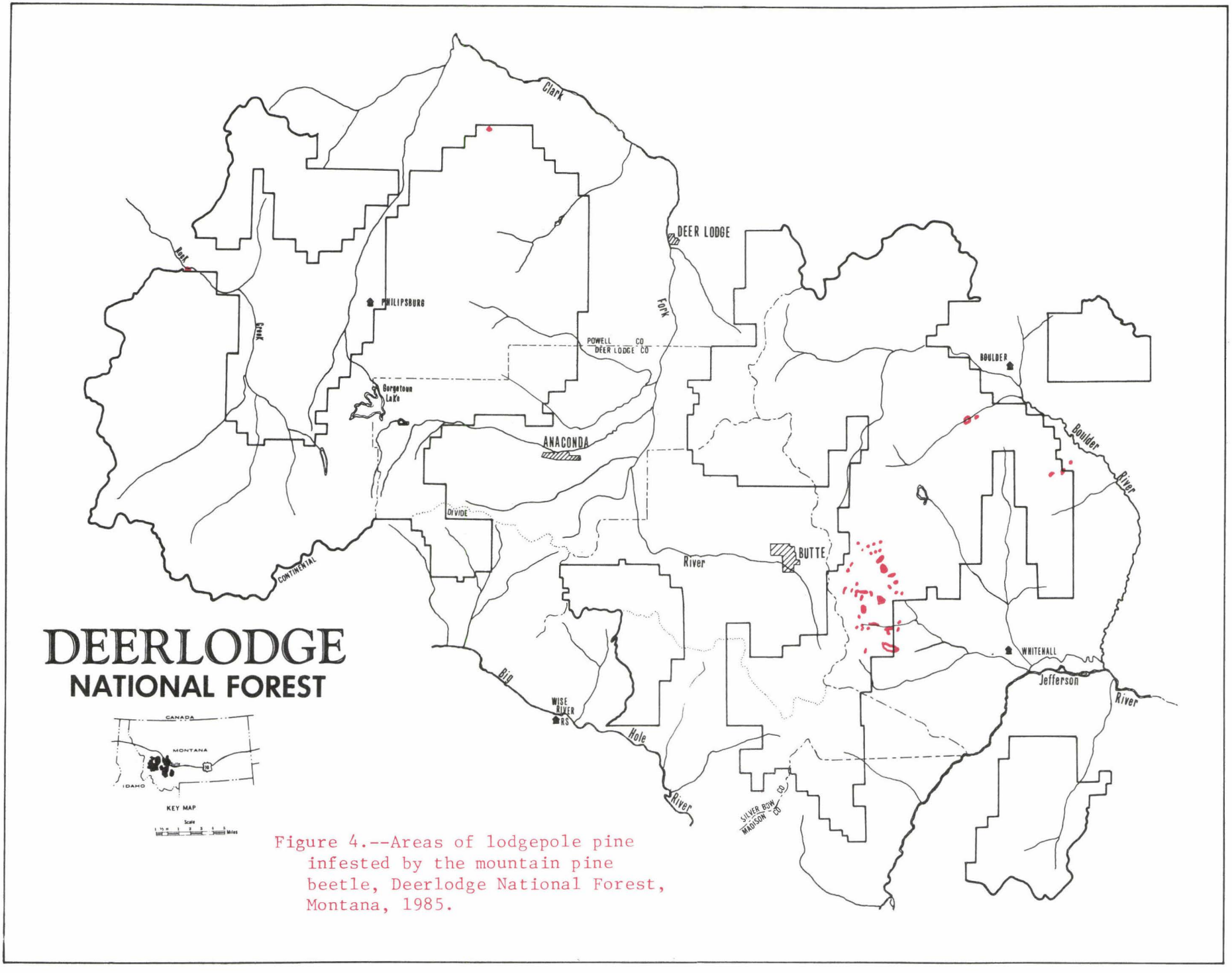



Figure 4.--Areas of lodgepole pine infested by the mountain pine beetle, Deerlodge National Forest, Montana, 1985.

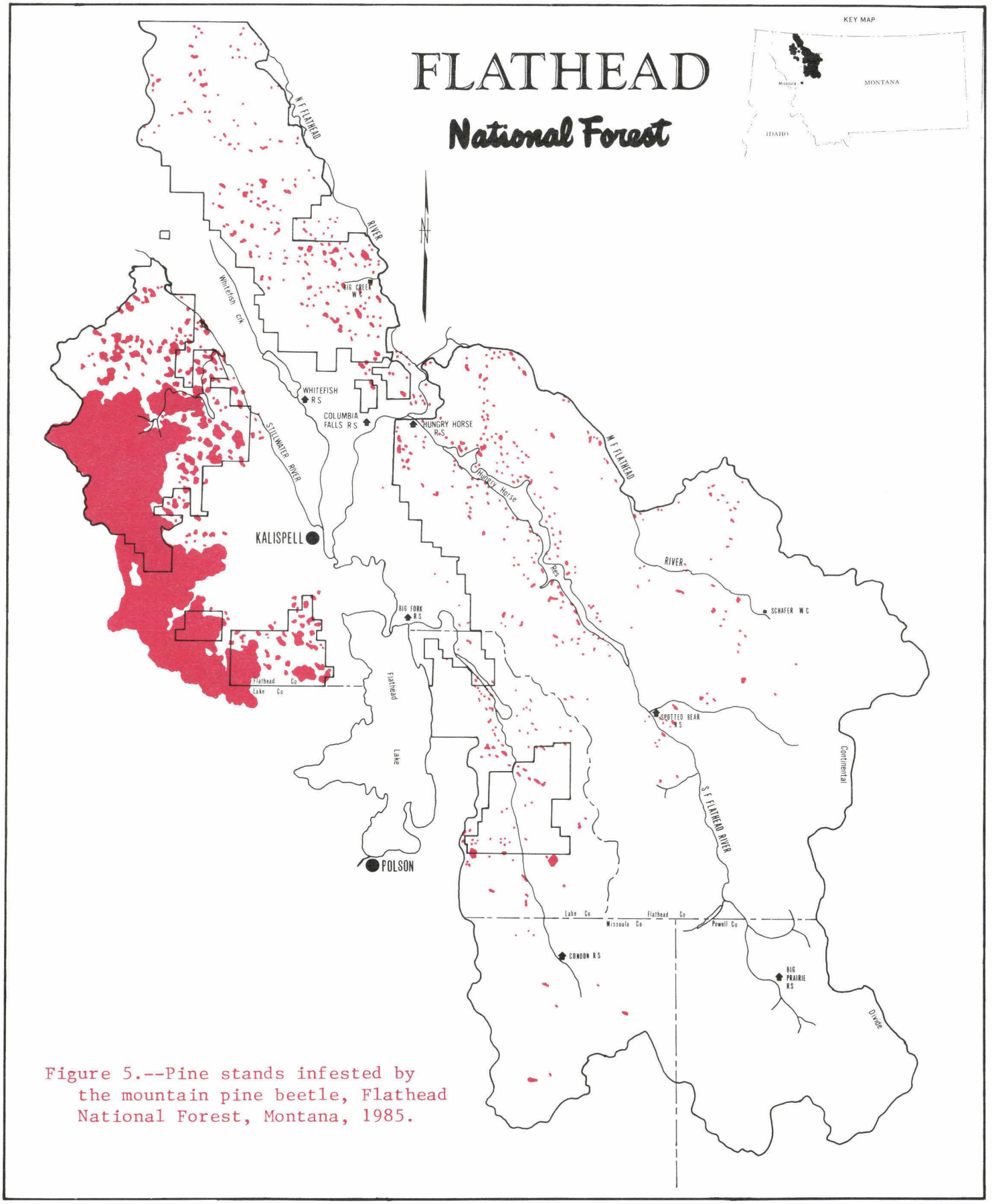



Figure 5.--Pine stands infested by the mountain pine beetle, Flathead National Forest, Montana, 1985.

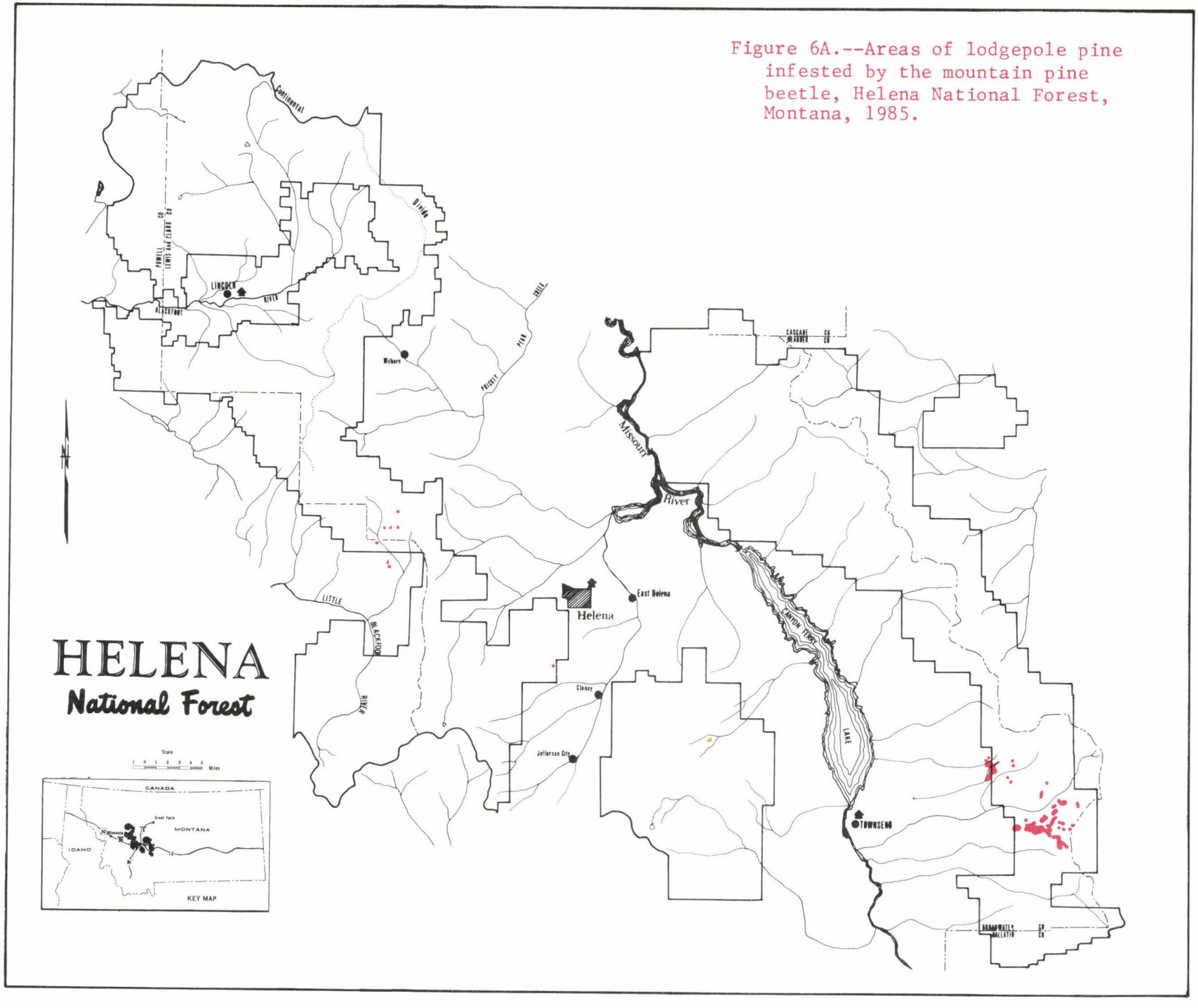



Figure 6A.--Areas of lodgepole pine infested by the mountain pine beetle, Helena National Forest, Montana, 1985.

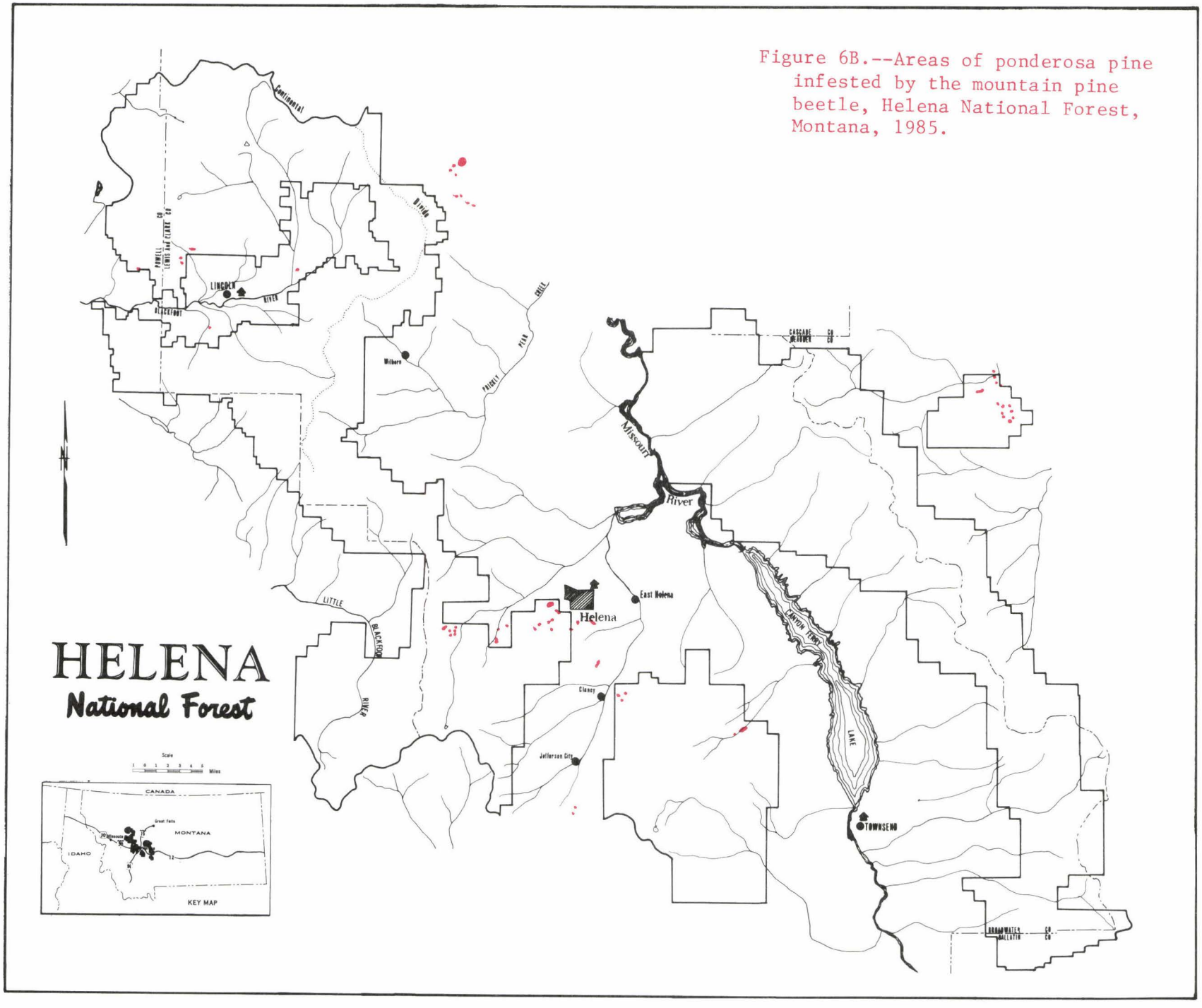
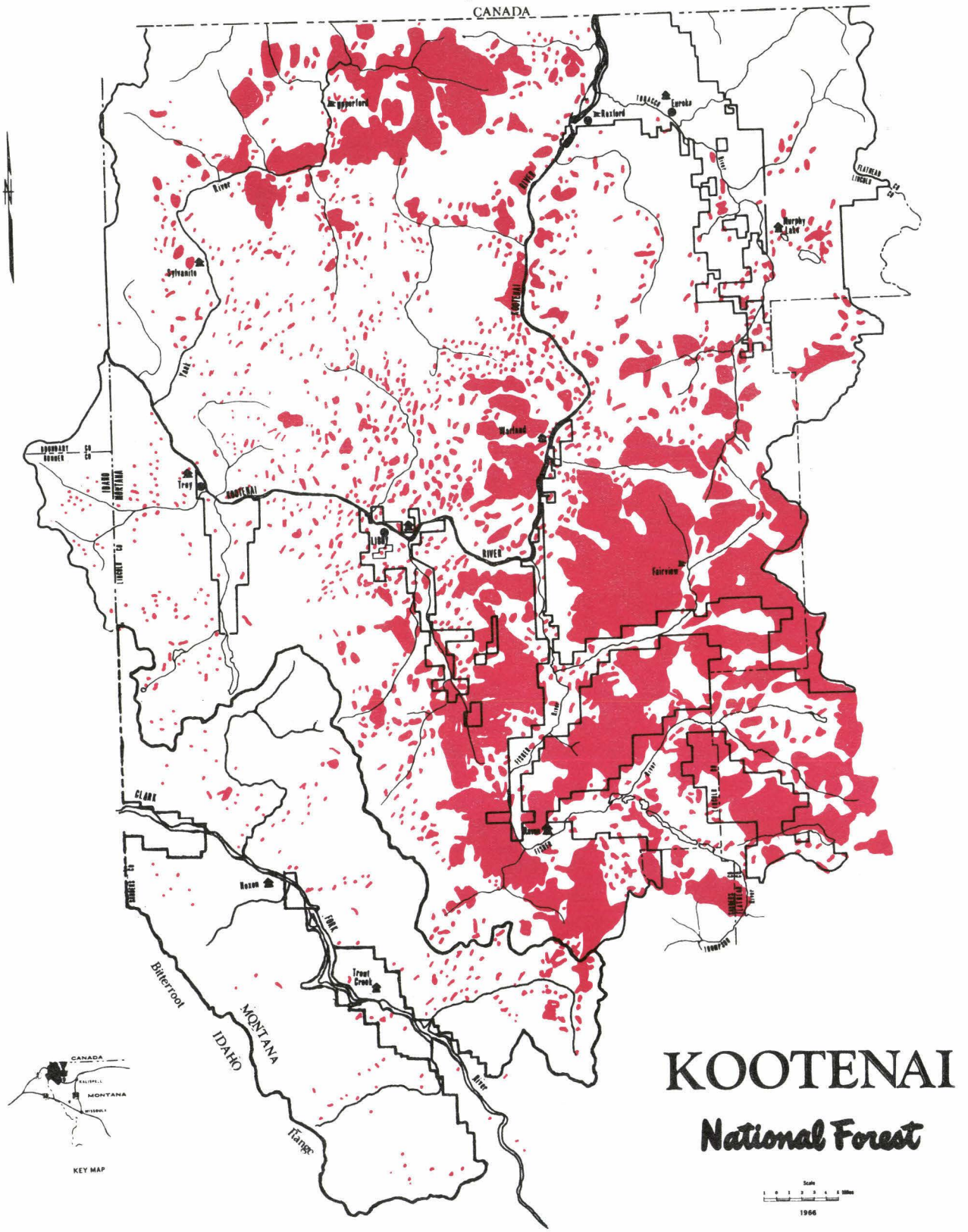



Figure 6B.--Areas of ponderosa pine infested by the mountain pine beetle, Helena National Forest, Montana, 1985.

Figure 7.--Pine stands infested by the mountain pine beetle, Kootenai National Forest, Montana, 1985.



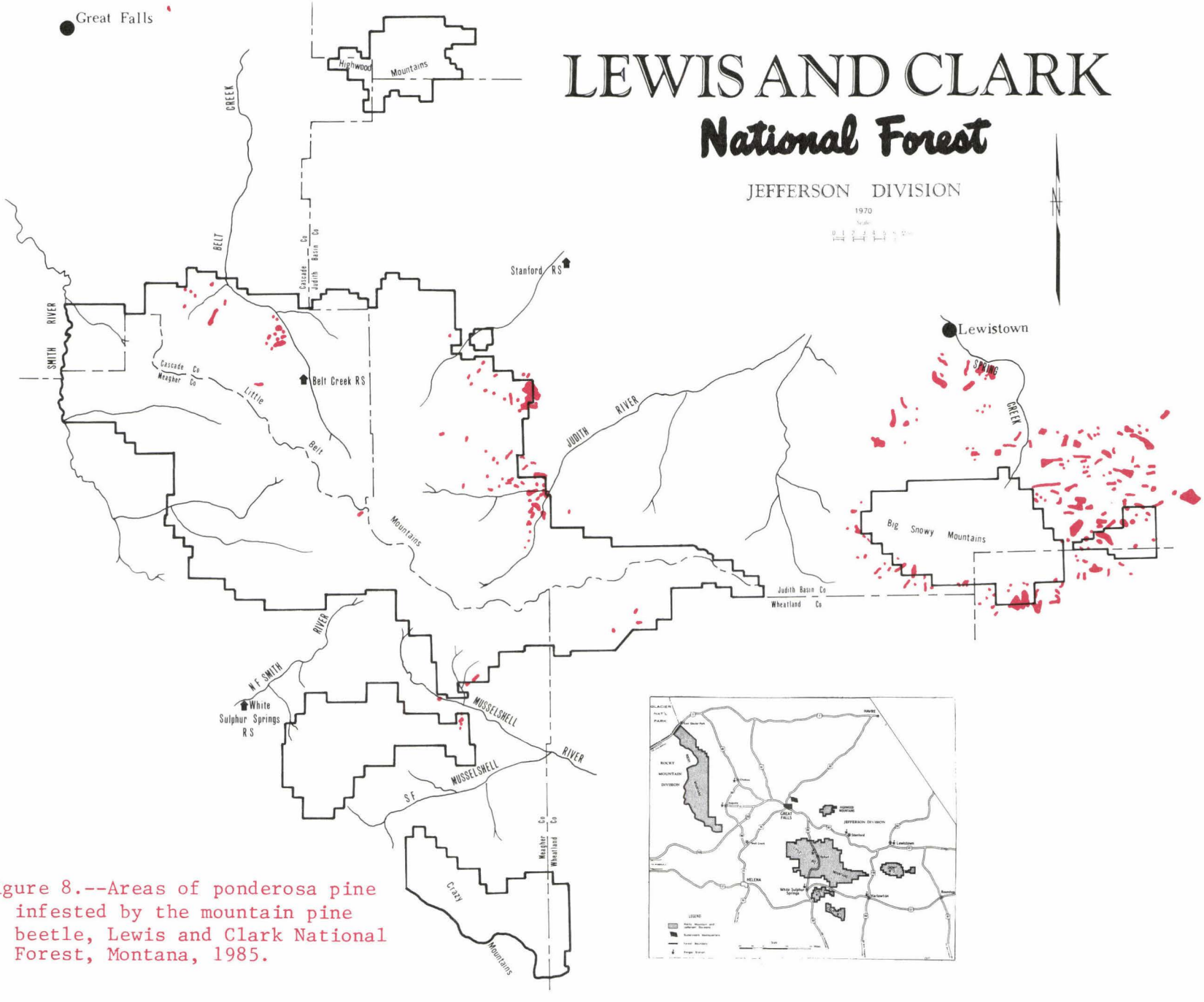



Figure 8.--Areas of ponderosa pine infested by the mountain pine beetle, Lewis and Clark National Forest, Montana, 1985.

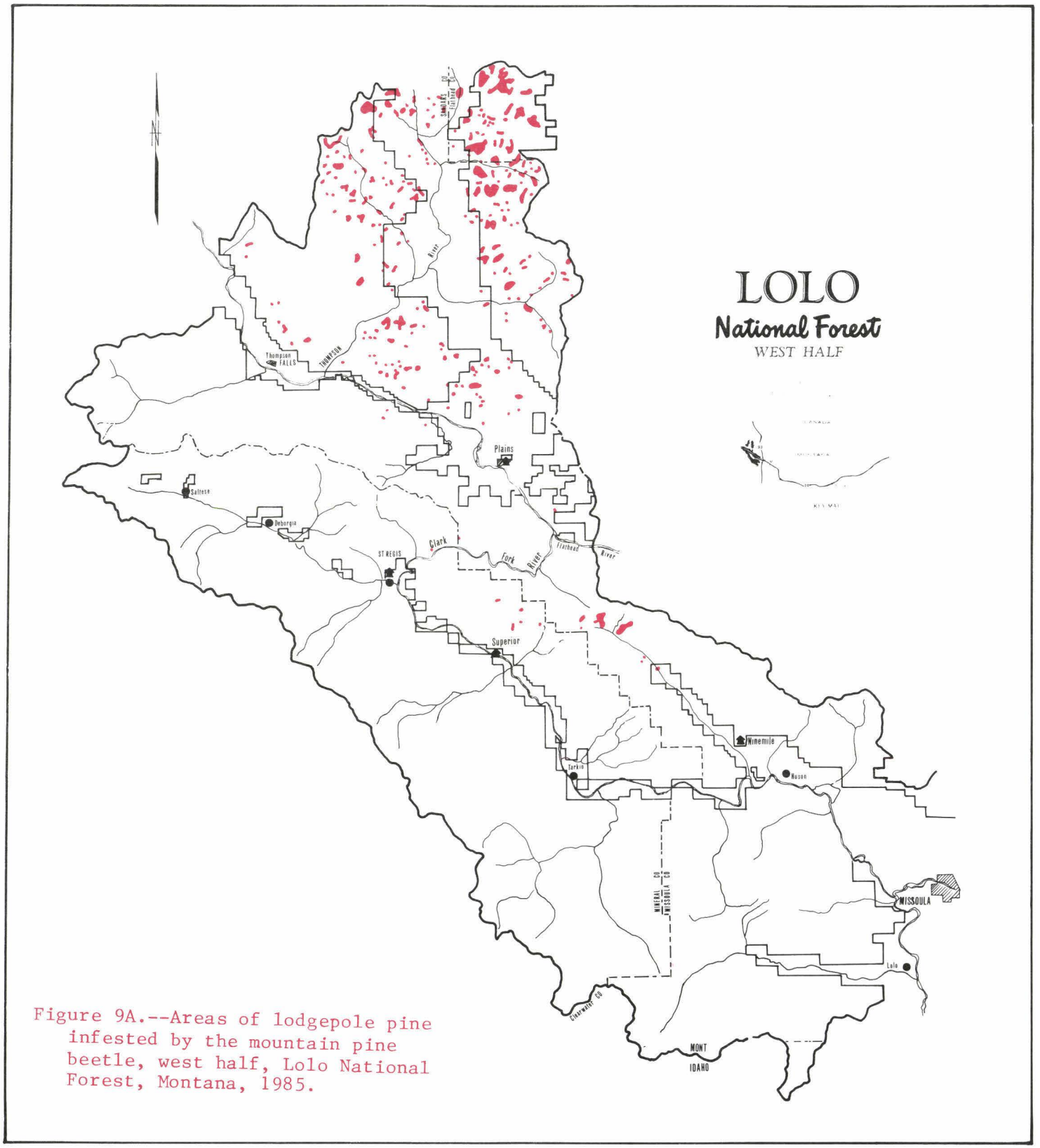
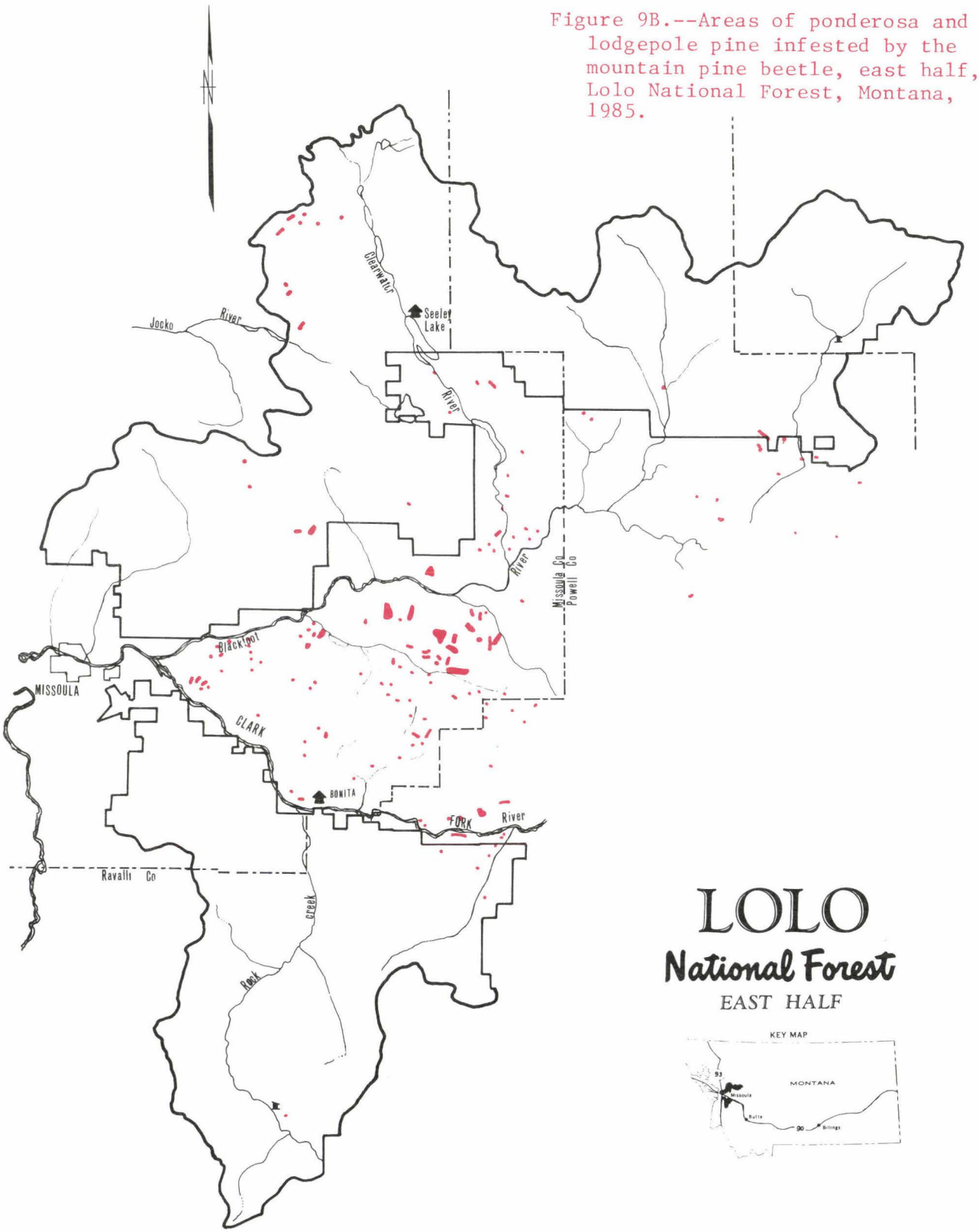



Figure 9A.--Areas of lodgepole pine infested by the mountain pine beetle, west half, Lolo National Forest, Montana, 1985.

Figure 9B.--Areas of ponderosa and lodgepole pine infested by the mountain pine beetle, east half, Lolo National Forest, Montana, 1985.



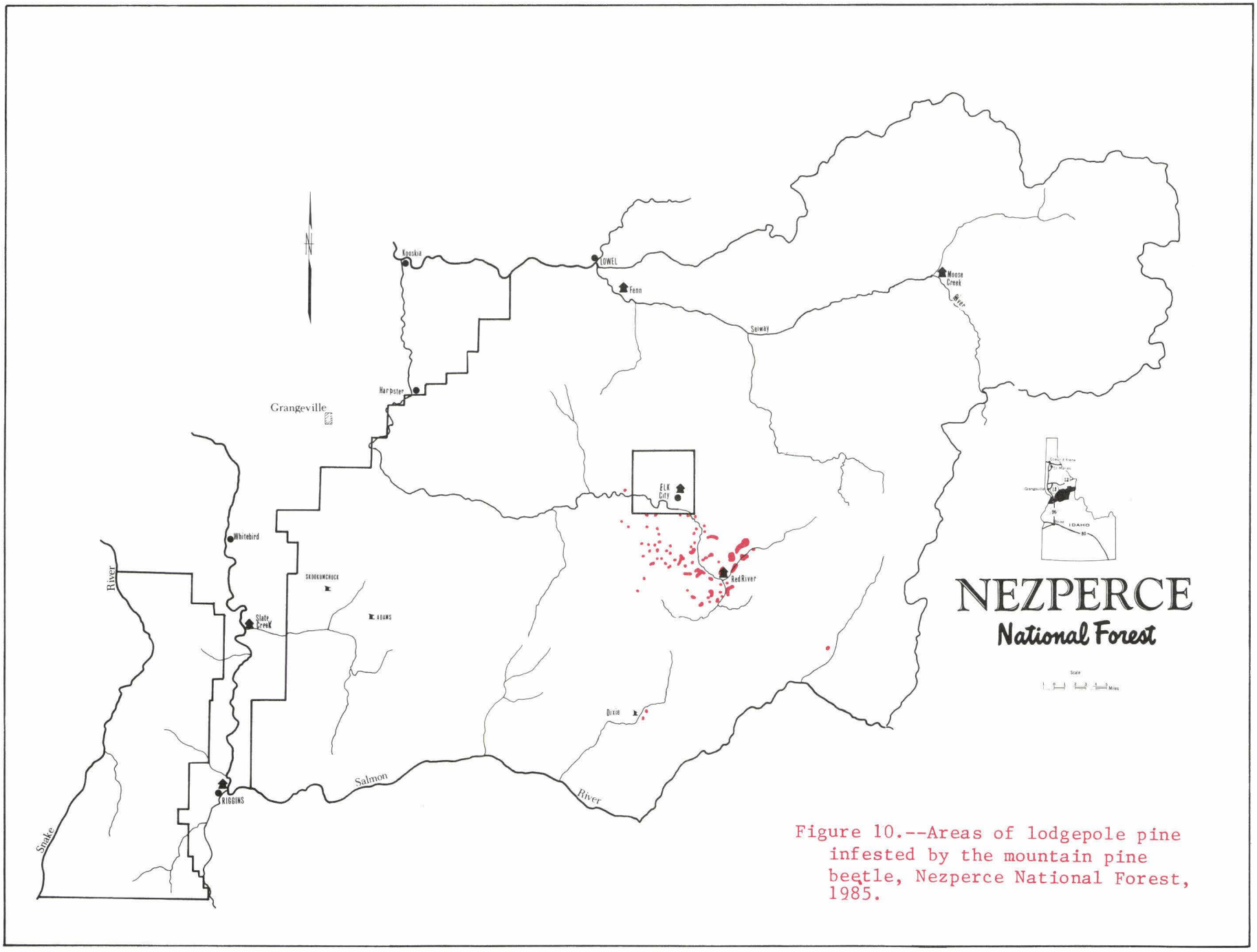
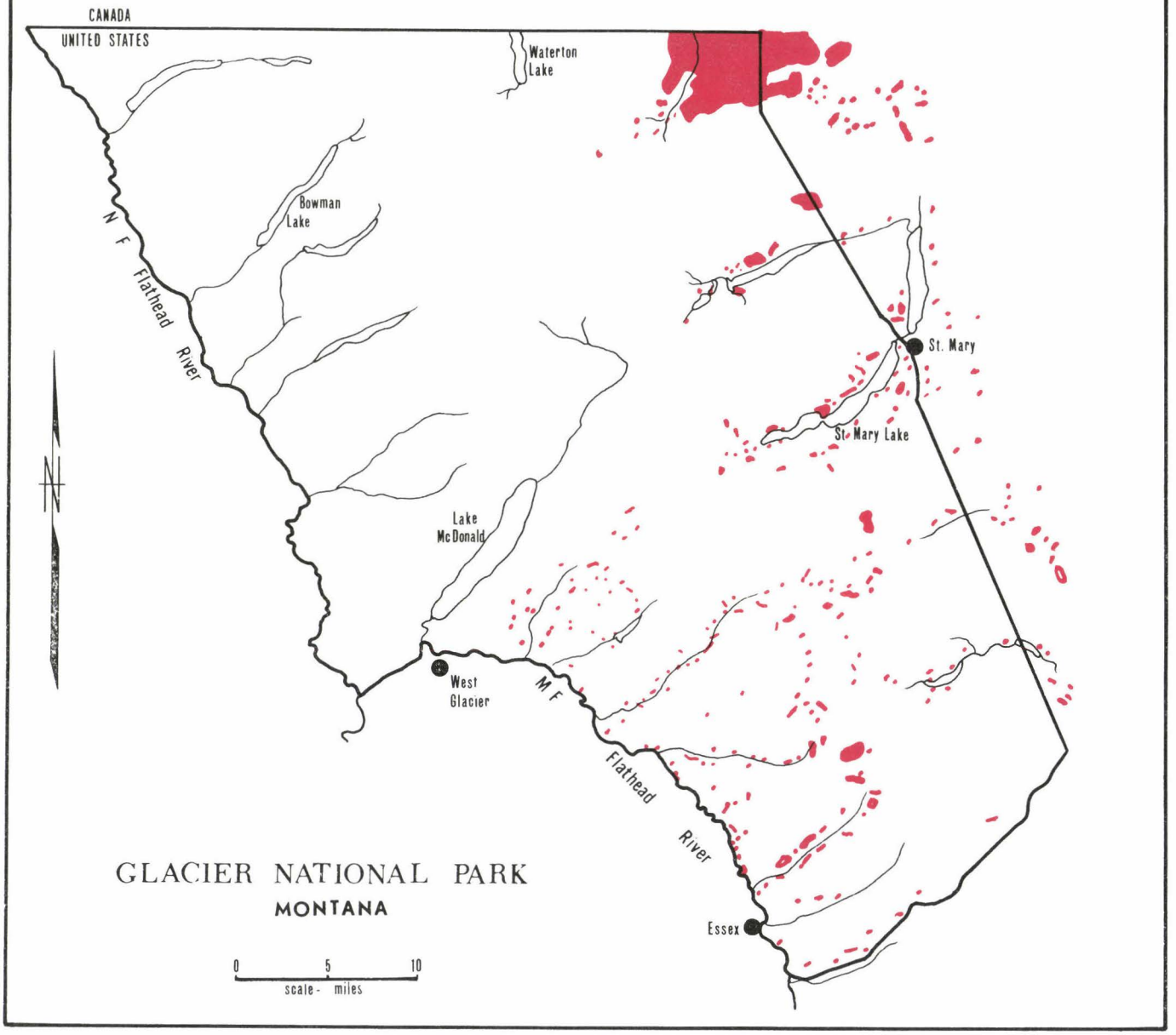



Figure 10.--Areas of lodgepole pine infested by the mountain pine beetle, Nezperce National Forest, 1985.

Figure 11.--Pine stands infested by the mountain pine beetle in Glacier National Park and on the Blackfeet Indian Reservation, Montana, 1985.



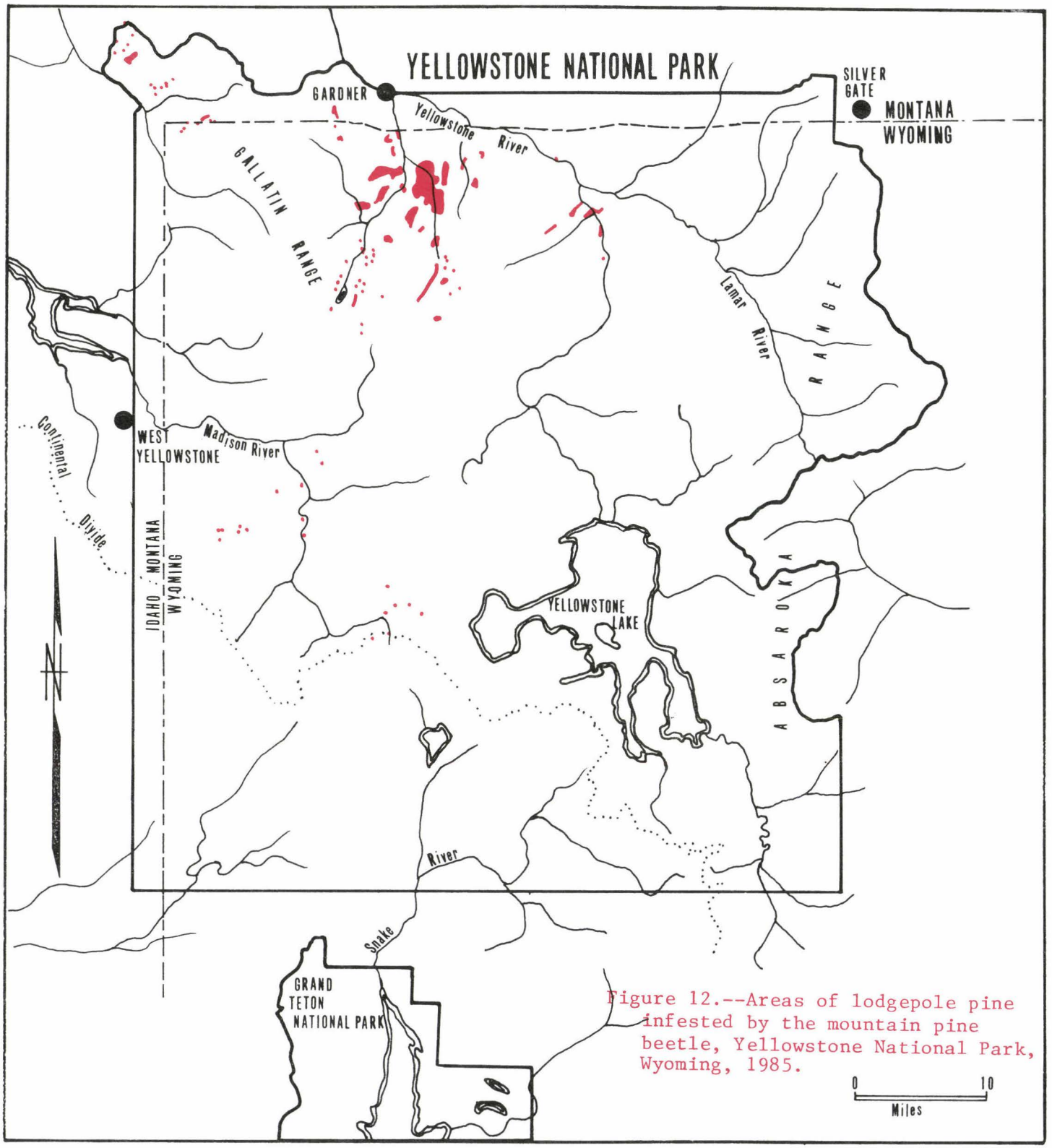



Figure 12.--Areas of lodgepole pine infested by the mountain pine beetle, Yellowstone National Park, Wyoming, 1985.

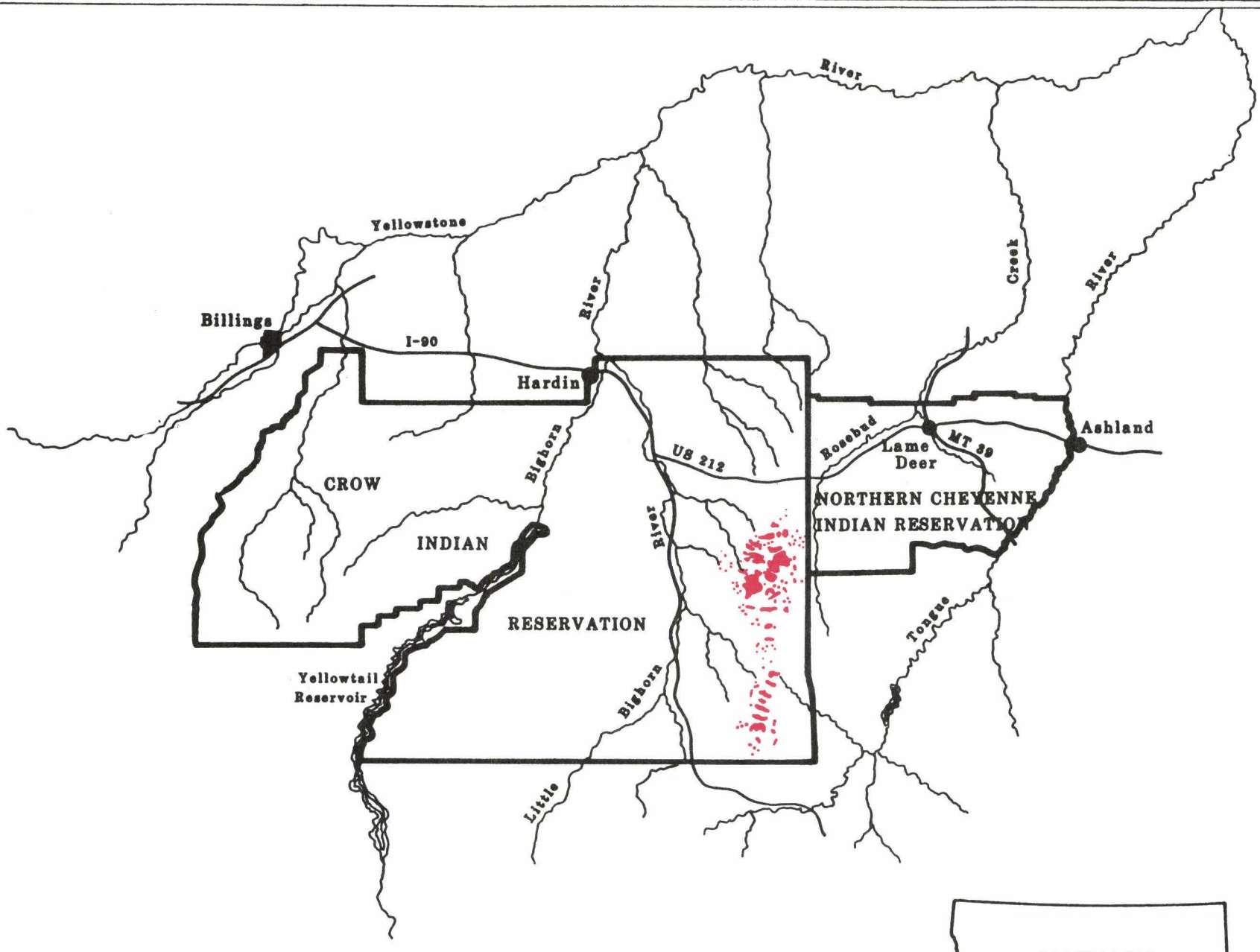



Figure 13.--Areas of ponderosa pine infested by the mountain pine beetle, Crow Indian Reservation, Montana, 1985.

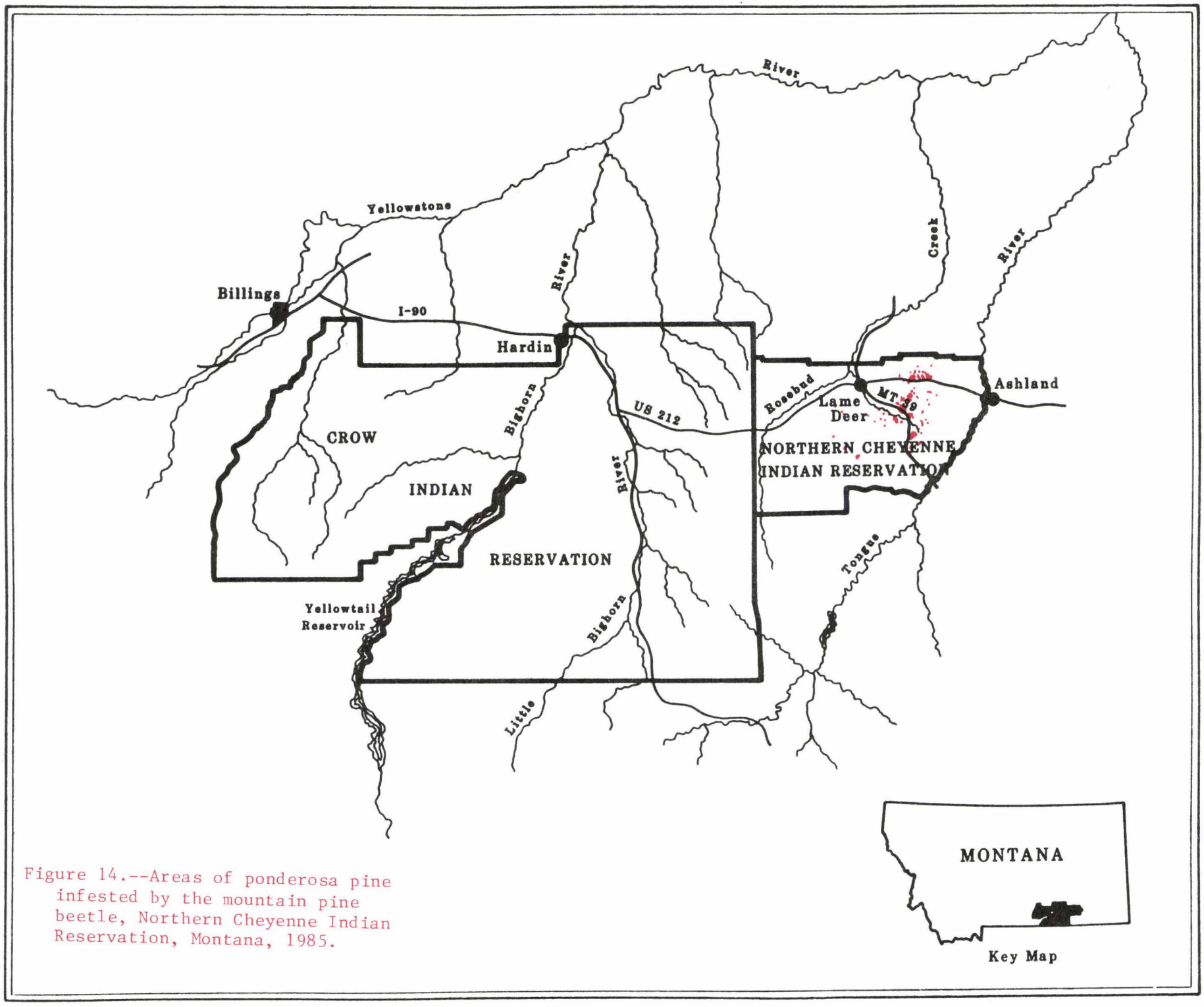



Figure 14.--Areas of ponderosa pine infested by the mountain pine beetle, Northern Cheyenne Indian Reservation, Montana, 1985.

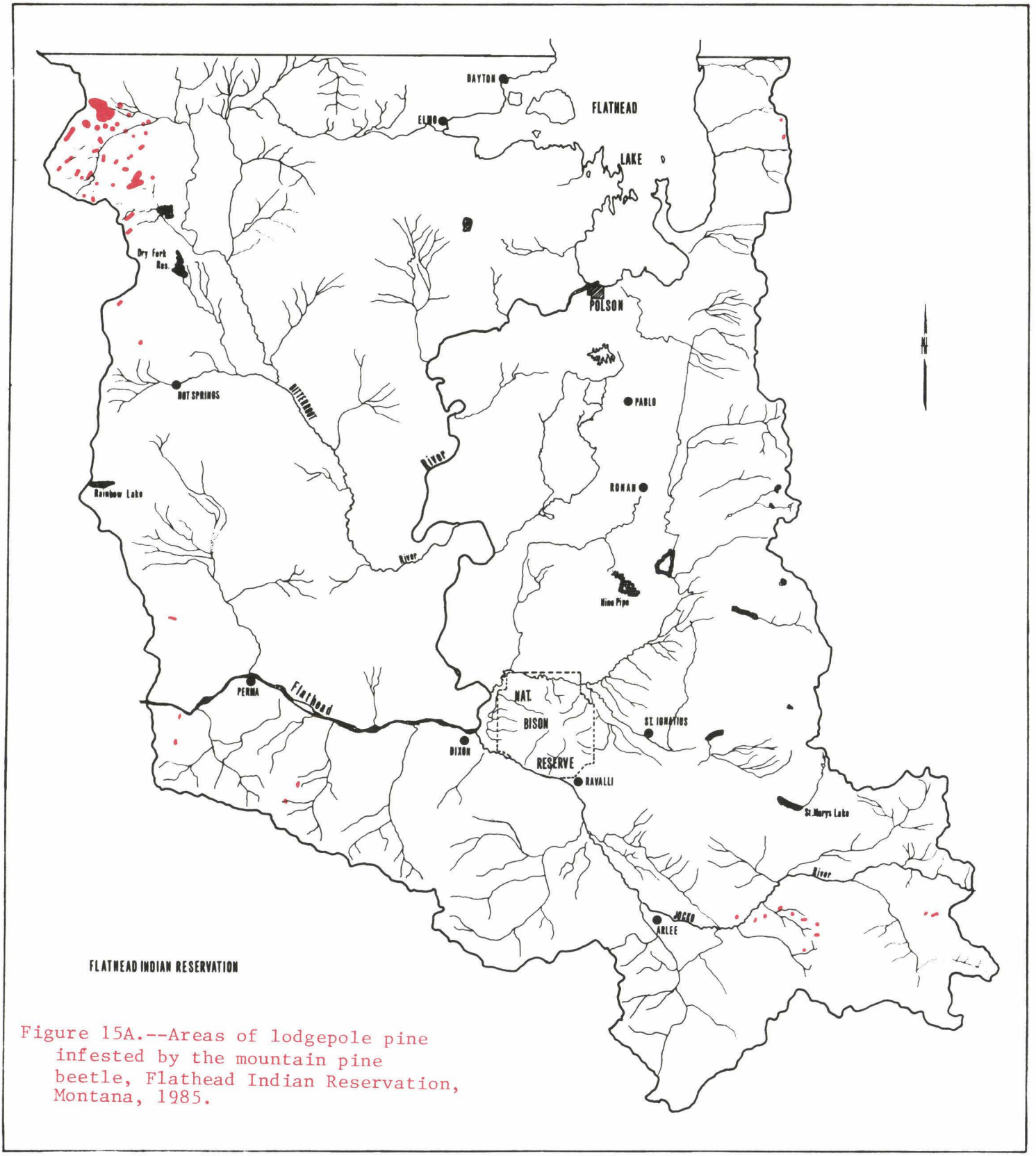



Figure 15A.--Areas of lodgepole pine infested by the mountain pine beetle, Flathead Indian Reservation, Montana, 1985.

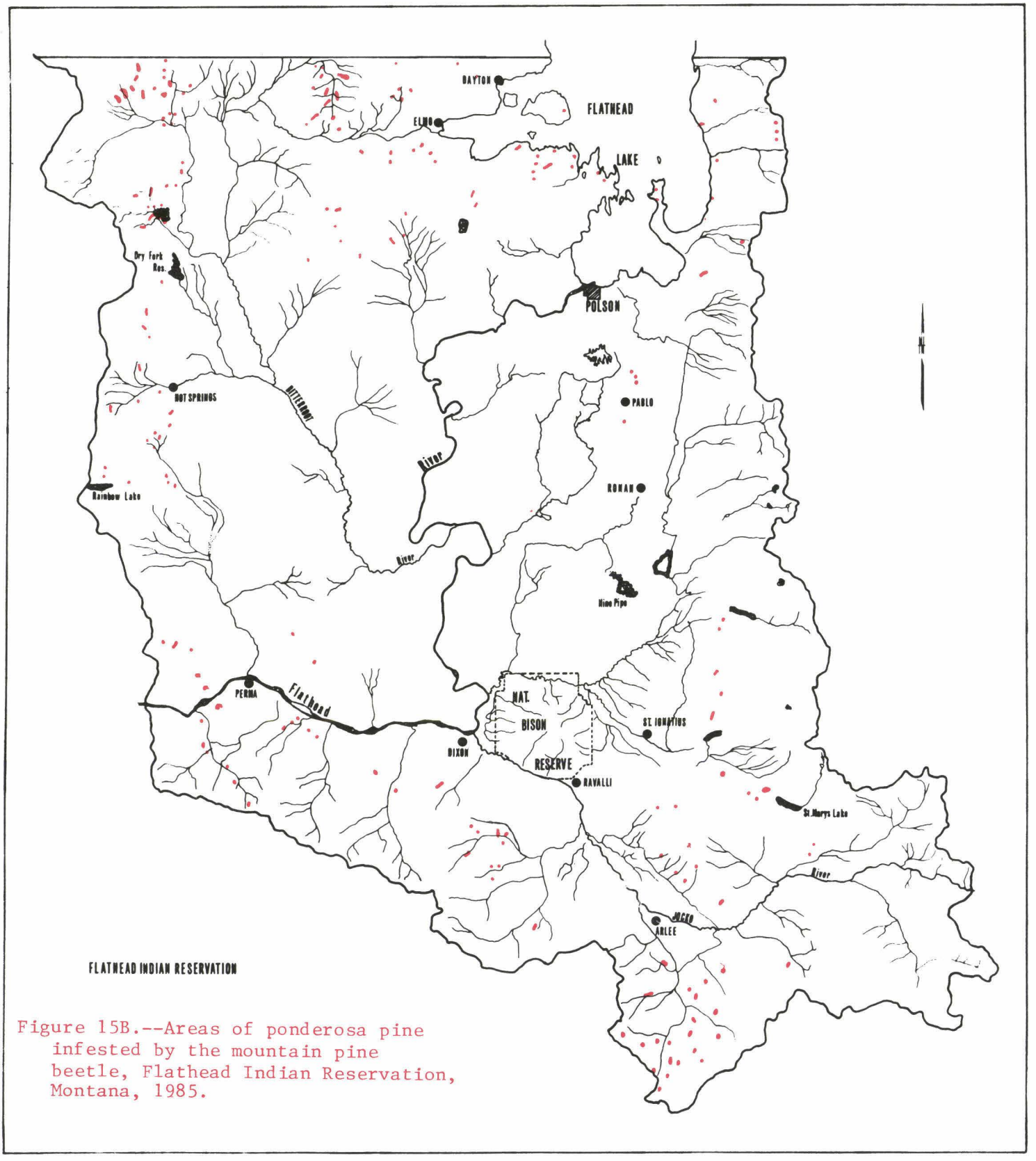



Figure 15B.--Areas of ponderosa pine infested by the mountain pine beetle, Flathead Indian Reservation, Montana, 1985.

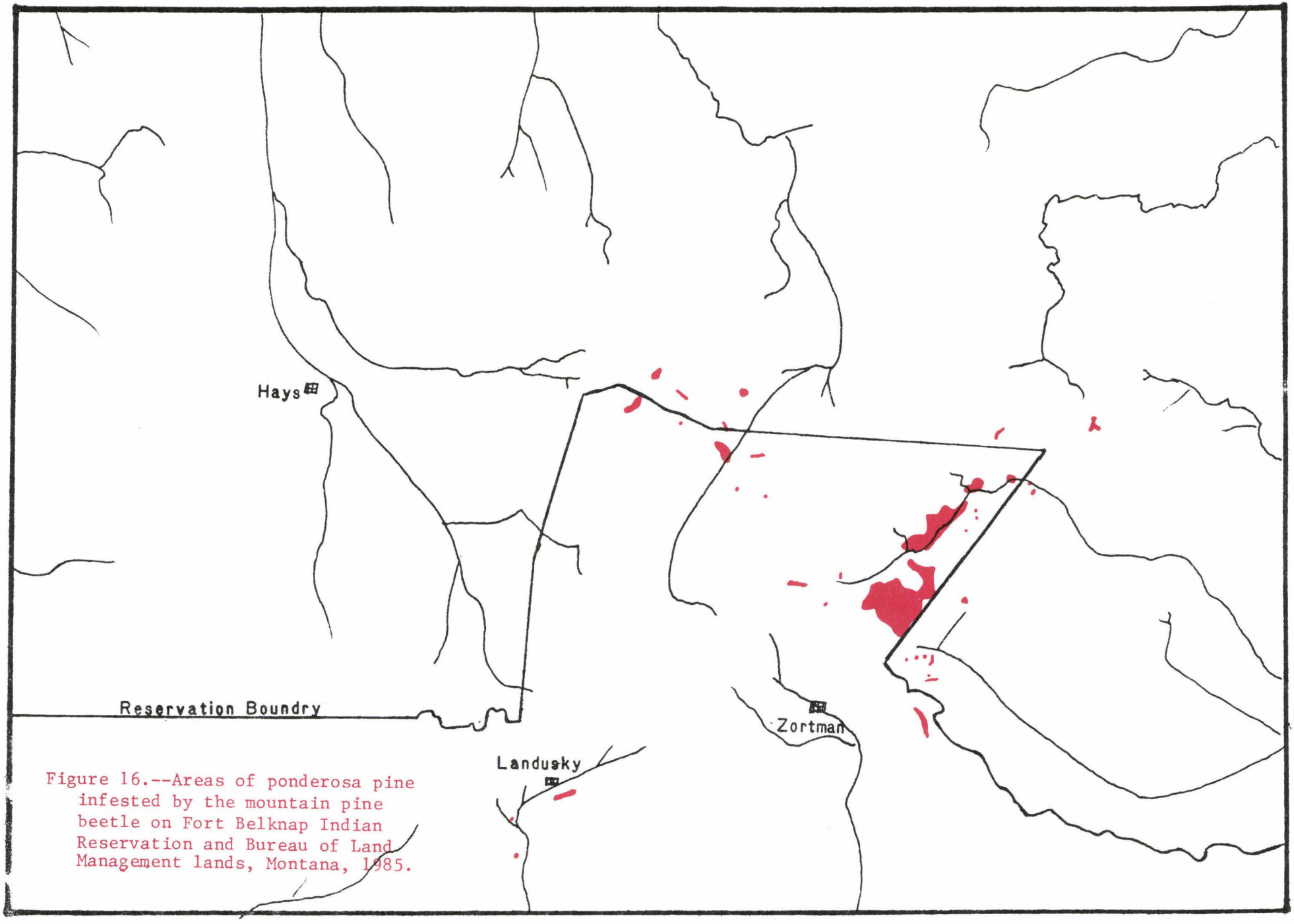



Figure 16.--Areas of ponderosa pine infested by the mountain pine beetle on Fort Belknap Indian Reservation and Bureau of Land Management lands, Montana, 1985.